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ABSTRACT

This guide has been organized under several headings: (1) Background Materials; (2) Energy Curricula; (3) Economics of Energy; (4) Todays Fuels; and (5) Future Fuels. Each section contains listings of instructional materials and their sources which are appropriate to the section's topic. In addition to the topical sections, additional sections include: (1) agencies for staff development and resource people; (2) field trip sites in or near Connecticut; and (3) model programs being implemented in Connecticut. A concluding section of the guide presents a matrix for quick reference to entries by cross reference of curriculum area with grade level. (RE)

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Energy Resources Inventory

-For- Connecticut Educators

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ENERGY RESOURCES INVENTORY
FOR
CONNECTICUT EDUCATORS

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INTRODUCTION

The purpose of the "Inventory" is to provide the educator with a selective and current guide to the who, what, where and how of energy resources in Connecticut. While technological and research groups may generate the long-range solutions to the energy question, the need is immediate for conservation of what we now have at hand.

The last three generations of Americans have been taught to consume energy without regard for the associated problems of cost, supply, reserves and so on. Now this attitude must be unlearned by many, and new modes of behavior have to be learned by all. This takes time and can be done most effectively in schools, especially elementary schools. Teachers and other educators can help in making the upcoming generation of consumers energy-wise. This can be done in all subject areas, not only science. For this reason, the "Inventory" contains information pertaining to social studies, economics and other fields.

USING THIS GUIDE

The Energy Resources Inventory for Connecticut Educators has been organized under several headings: A. Background Materials; B. Energy Curricula; C. Economics of Energy; D. Today's Fuels; and E. Future Fuels. In addition to these major sections, there are three supplementary sections of value to educators: Agencies and People Providing Staff Development Programs (also resource people); Model Programs; and Field Trip Sites. Subheadings further categorize the resources within a section.

Each resource in the inventory is annotated to show its potential value and use in the school program. Appropriate grade levels are suggested,but this will vary with the locale and the way the material is used. The increasing importance of energy education has led to a rapid growth of available materials. Our purpose has been to provide a representation of resources available rather than a comprehensive inventory.

Some of the curricula listed can be found in the ERIC Document System. They can ordered in microfiche (MF) and/or hardcopy (HC) for the prices indicated from:

EDRS
P.O. Box 190
Arlington, Virginia 22210

A. BACKGROUND MATERIALS

(A1) AN INTRODUCTION TO ENERGY SOURCES. The Energy Committee, League of Women Voters, Cheshire, CT.

This booklet contains very basic information on fossil fuels, nuclear fission, and alternative energy sources. It is an introduction to the study of energy intended for use by the general public.

(A2) ENERGY & EDUCATION, Editor, Mary T. McGuire. National Science Teachers Association, 1742 Connecticut Avenue, NW Washington, DC 20009, free.

Since October 1977, Energy & Education has been published in response to the communication needs of the growing number of teachers and administrators involved in energy education. This is a bi-monthly newsletter designed to serve as an information exchange medium.

(A3) THE ENERGY-ENVIRONMENT SOURCE BOOK, by John M. Fowler. National Science Teachers Association, Publications Department, 1742 Connecticut Avenue, NW, Washington, DC 20009. $5.00 (Stock No. 471-14692).

Up-to-date, authoritative, complete, the Source Book deals candidly with the issues and problems of energy, as well as with the basic facts. Written for teachers in an informal, easy-to-read style, it includes a wealth of quantitative information in extensive tables and illustrations. Technical appendices and a glossary extend its usefulness.

(A4) EXPLAINING ENERGY: A MANUAL OF NON-STYLE FOR THE ENERGY OUTSIDER WHO WANTS IN! Lee Schipper, Energy Resource Group University of California, Berkeley, California. National Technical Information Service, U.S. Dept. of Commerce, 5285 Port Royal Road, Springfield, Virginia, 22161, printed copy $6.00; microfiche $2.25.

This guide or outline contains information about the most asked about, controversial, and basic characteristics of our energy system. Intended for use by people in a variety of disciplines both in and out of the physical sciences, this manual is organized around the parameters of supply, demand, environmental impact, growth, conservation, future energy sources, research and development, and socio-political issues. There is an extensive energy bibliography contained in this guide.

(A5) THE STATUS OF STATE ENERGY EDUCATION POLICY. Education Commission of the States, Suite 300, 1860 Lincoln Street, Denver, CO 80295, $4.

This is the final report of the results of a survey to determine the status of state policies and practices regarding energy education among state education agencies, state offices of energy governors' offices and state legistators. 1978.

(A6) AMERICAN GAS ASSOCIATION TEACHING AIDS ABOUT GAS. American Gas Association, 1515 Wilson Boulevard, Arlington, VA 22209, free.

This is a listing of teaching aids for grades K-12 available from the American Gas Association. It is updated each year.

(A7) ENERGY: A GUIDE TO ORGANIZATIONS AND INFORMATION RESOURCES IN THE UNITED STATES, 2nd Edition. Who's Doing What Series: 1, a publication of the Center for California Public Affairs (ED 167 377. 1978, 214 pages, MF $.83.

This is a central source of information on organizations in the United States that are involved in energy issues.

(A8) ENERGY EDUCATION RESOURCE GUIDE. Education Information Services, Rhode Island Dept. of Education.

Energy Education is one in a series of resource guides of energy education materials produced by the Dissemination Services Unit of the Bureau of Technical Assistance of the Rhode Island Department of Education. This guide separates listings under the categories of General, Elementary, Secondary, K-12, Journal Articles, and Resources.

(A9) ENERGY EDUCATION MATERIALS INVENTORY, Vol. 1. Superintendent of Documents, U.S. Government Printing Office, Washington DC 20402. $5.24 (Stock No. 061-000-001832). Microfiche copies are available for $3.00 from: NTIS, U.S. Department of Commerce, 5285 Port Royal Road, Springfield, VA 22161.

Published by the U.S. Department of Energy, this is a comprehensive listing of energy education materials published up to May 1976 and includes audiovisuals, books, instructional materials, student activities and reference sources. Enementary and secondary level materials are included.

(A10) ENERGY-ENVIRONMENT MATERIALS GUIDE. USTA, 1742 Connecticut Avenue, NW, Washington, DC 20009.

This is an annotated resource reference on energy containing four reading lists. One of these is a teacher bibliography broken down into topic areas and annotated to give the teacher a content review of each reference and appropriate source information. The other three reading lists are for students and are separated into categories K-6, 5-9, and 8-17.

(A11) ENVIRONMENTAL EDUCATION INFORMATION REPORT. The Eric Science, Mathematics and Environmental Education Clearinghouse in cooperation with Center for Science and Mathematics Education, The Ohio State University.

This publication contains annotations and indexes to selected articles announced in Current Index to Journals in Education (CIJE) from 1966 to 1978.

(A12) RESOURCES FOR SCHOOL ENERGY NEEDS. Resource and Referral Service, The Center for Vocational Education, Ohio State University, 1960 Kenny Road, Columbus, OH 43210, free.

This is a mini-list containing the names, addresses, and telephone numbers of organizations able to provide educators with assistance on the topic of school energy needs. It contains references to nine organizations and includes the availability of products and services.

(A13) SELECTED DEPARTMENT OF ENERGY PUBLICATIONS. Single copies are available from Department of Energy Technical Information Center, P.O. Box 62, Oak Ridge, TN 37830. Stock No. DOE/OPA 0027 (Revised), free.

This guide lists general interest and educational publications of DOE.

(A14) THE ENERGY FILMS INDEX: AN EDUCATOR'S GUIDE TO CURRENT ENERGY FILMS, by Sharon Scherner and others (ED 167 455. 1978. 42 pages. MF $.83, Energy and Man's Environment, Portland, OR.

This is one of a set of seven energy education documents (ED 167 459 through 167 455 produced by Energy and Man's Environment. This volume cites and descriges 241 films on energy.

(A15) TWENTY-SEVEN ENERGY FILMS. DOE Technical Information Center P.O. Box 62, Oak Ridge, TN 37830, free.

This is a brochure, listing popular energy-related films of conservation, the environment, coal, fusion, geothermal, nuclear, and solar energy, space, transportation and history.

B. ENERGY CURRICULA

(B1) AWARD WINNING ENERGY EDUCATION ACTIVITIES FOR ELEMENTARY AND HIGH SCHOOL TEACHERS. Department of Energy, Technical Information Center, P.O. Box 62, Oak Ridge, TN 37830. (38 page booklet).

Eleven winning entries to a National Science Teachers Association Teacher Participation Contest are described so that the units might be replicated by elementary or secondary teachers. All aspects on energy are addressed, from fossil fuels sources and metallic recycling to solar energy and wind power. Profusely illustrated, the majority of the activities are at the middle and high school levels.

(B2) CONSERVATION OF ENERGY: TEACHER'S ACTIVITY GUIDE. Louisiana State Dept. of Education, P.O. Box 44064, Baton Rouge, LA 70804.

This guide contains suggested activities for use in energy education curricula. The information contained in the guide was gathered and propared by teachers from grades K-12. Many of the activities provide ways for immediate changes in our use of energy, but of even greater importance is the philosophy that motivates this and other efforts to deal with the energy crisis on a long-range basis. Includes background information.

(B3) ENERGY ACTIVITIES FOR THE CLASSROOM, by Herbert L. Coon and Michele Y. Alexander. SMEAC/Science, Mathematics, and Environmental Education Information Analysis Center, College of Education, The Ohio State University, 1200 Chambers Road, Columbus, OH 43212.

This publication contains interdisciplinary energy activities for the classroom, and is grouped by grade levels

K-3, 4-6, 7-9, 10-12. Each classroom activity is organized with purpose, subject, concept, and related reference material. This booklet draws heavily on ideas and factual materials found in the ERIC Center for Science, Mathematics, and Environmental Education.

(B4) ENERGY AWARENESS EDUCATION. Resource Materials, Energy Education Activities Grades K-3, and 4-12. Oklahoma State Dept. of Education, 1977.

A series of three books providing teachers with instructional activities as a starting point to integrate energy education into the existing curriculum. The Resource Materials book contains background for teachers and students on energy information. The other 2 books are divided K-3 and 4-12 and contain activities centered around specific energy concepts. Included are many charts, graphs, and illustrations that can be reproduced for student use.

(B5) ENERGY-ENVIRONMENT MINI-UNIT GUIDE. National Science Teachers Association, 1742 Connecticut Avenue, NW Washington DC 20009, $3.00.

This guide contains seven complete sets of learning activities which teachers can use to involve students in energy matters. These mini-units, which cover a varying number of classroom meetings, range in level from primary to high school. Each mini-unit is designed to be a complete unit.

(B6) ENERGY HISTORY OF THE UNITED STATES 1776 - 1976, U.S. Department of Energy, Office of Public Affairs, Washington, DC 20585. (Wall Chart and User's Manual, nominal fee).

Publicized as a "one-page book", the three-foot by four-foot chart traces the history of energy discovery, transformation, use, and abuse through two centuries. The format allows one to compare developments within a given era or follow the influence of a certain form of energy through several decades. You may read the chart any way you wish, the number of revelations being almost infinite. In case you want more direction, a user's manual is provided, filled with possible strategies, suggestions for classroom use, and more information. Spend a day with it. Can be used in many diverse educational settings.

(B7) INTERDISCIPLINARY STUDENT/TEACHER MATERIALS ON ENERGY, THE ENVIRONMENT, AND THE ECONOMY. Department of Energy, Technical Information Center, P.O. Box 62, Oak Ridge, TN 37830, free.

The Department of Energy in cooperation with the National Science Teacher's Association are developing preliminary classroom instructional materials concerning energy sources, uses, conservation, and interactions with social and political concerns. Interdisciplinary in character, the units are very well organized and self-contained. An ongoing revision process insures that a tested set of resources will be established. These excellent guides should be an essential element in the energy planning of instructors.

The units are described below:

THE ENERGY WE USE (1, 2) An introduction to energy that begins with student recognition of common energy forms, and progresses through important energy sources such as the sun, wind, water, and fossil fuels. Stock No. EDM-1029.

COMMUNITY WORKERS AND THE ENERGY THEY USE (2,3) This unit highlights "helpers" such as the oil delivery, the gas station attendant, and the meter reader, who are all involved in the delivery of energy, as well as the farmer and the banker, whose jobs are closely linked to energy. Stock No. EDM-1030.

ENERGY AND TRANSPORTATION (3, 4, 5) Using classification activities, picture studies, and other developmental approaches, students learn about transportation in the neighborhood, community, and nation. Stock No. HCP/U 3841-001.

NETWORKS: HOW ENERGY LINKS PEOPLE, GOODS, AND SERVICES (4, 5) Lessons include making models of electrical systems and naming the interacting parts. In such lessons as "The Electrical Energy System in a City," students learn about the importance of systems and how we depend on the electrical systems in our community.

BRINGING ENERGY TO THE PEOPLE: GHANA AND THE U. S. (6, 7) Comparing the energy uses in Ghana and its capital city, Accra, with the Washington, DC metropolitan area, this unit considers energy as a basic need in terms of climate, location, existing and planned power sources, transportation systems, and life styles.

TWO ENERGY GULFS (6, 7) A comparative case study of the energy potentials in the Gulf of Mexico and the Persian Gulf. Considers geography, geology, climate and production technology, as well as the effects of oil production on the cultures of the two regions.

MATHEMATICS IN ENERGY (7, 8) Middle school students deal with a wide range of energy problems through the use of basic mathematical processes. Included are fractions, decimals, graphs, conversions, statistics, and the manipulation of energy units such as watts, calories, and joules. Stock No. HCP/U 3841-002.

ENERGY, ENGINES, AND THE INDUSTRIAL REVOLUTION (8, 9) A natural theme at the junior high level where the Industrial Revolution is an important topic in U.S. History and World Geography courses. The social studies lessons focus on the relation of energy sources to the growth of cities and industry, inventors and inventions, and the effects of the Industrial Revolution on cities and people. Science lessons are concerned with energy sources and energy conversions, with special attention given to the heat engine. Stock No. EDM-1032.

ENERGY TRANSITIONS IN UNITED STATES HISTORY (8, 9) Charts the growth of American energy use and traces the history of the major sources of energy in the U.S. Examines the past interactions between man as an energy user, and his environment, and investigates the future of alternative energy technologies. Stock No. HCP/U 3841-004.

TRANSPORTATION AND THE CITY (8, 9) Relates transportation to energy use. Social studies lessons deal with transportation systems and concepts of efficiency, and with the effects of the automobile on the urban community. Science lessons apply supply and demand calculations to oil resources and present some simple experiments which anticipate new transportation technology. Stock No. EDM-1031.

ENERGY IN THE GLOBAL MARKETPLACE (9, 10, 11) Explores the role of energy in world trade and in the global balance of power. Examines the major energy "haves" and "have-nots", and investigates the process by which energy prices are determined.

HOW A BILL BECOMES A LAW TO CONSERVE ENERGY (9 - 12) Activities focus on the legislative process and include a fabricated Citizen's Band (CB) radio conversation,

a simulated congressional hearing on the 55 MPH speed limit bill, adapted from the actual hearing record, and exercises in graph construction and interpretation. Stock No. EDM-1033.

AGRICULTURE, ENERGY, AND SOCIETY (10-12) Based on the conviction that an energy/food production crisis of serious dimensions is already with us, and that students need to understand this problem in order to contribute to its solution. Lessons present basic energy-economics facts of food production and social studies themes such as profit and loss, and the law of diminishing returns. Science lessons build skills in data analysis, graph interpretation, and an understanding of energy units and their conversions. Stock No. EDM-1034.

THE NEW WESTWARD MOVEMENT (11) Investigates energy resources in the West and studies the effects of possible large-scale resource development on the economy, environment, and social structure of the Western United States.

U.S. ENERGY POLICY - WHICH DIRECTION? (11, 12) Designed as a companion to the unit "How a Bill Becomes a Law to Conserve Energy," which studies the workings of the legislative branch, this unit concentrates on the administrative arm of government and the various forces that go into formulating a national policy. Stock No. HCP/U 3841-003.

Other units which will be available in 1980 are:

"E" THE MAGNIFICENT MAGICIAN (K, 1)
ENERGY: THE THREAD OF LIFE (3, 4, 5)
CANADA, MEXICO AND THE UNITED STATES: ENERGY MIX OR MIX-UP? (6-9)
EXPONENTIAL GROWTH (6-9)
SOLAR ENERGY (6-9)
COAL (6-9)
ENERGY CONSERVATION AS A POLITICAL ISSUE (7-9)
LESS DEVELOPED COUNTRIES AND ENERGY (9-12)
APPROPRIATE TECHNOLOGY (9-12)
ENERGY FLOWS IN NATURAL SYSTEMS (9-12)
CRITICAL THINKING (9-12)
LONG RANGE AND GLOBAL EFFECTS OF CO_2 (9-12)
ENERGY AND THE AUTOMOBILE (9-12)
NUCLEAR ENERGY (9-12)
BIOCONVERSION (9-12)
THERE IS ENOUGH ENERGY, BUT... (9-12)
ENERGY AND MONEY (9-12)
ENERGY AND WATER (9-12)
ENERGY FOR THE FUTURE (9-12)

(B8) ALL ABOUT ENERGY, Richard Dalton. The Dow Chemical Company, Midland, Michigan.

This is a book that provides basic information for lower elementary grades about energy forms, sources, uses, and conservation practices. Colorful and appealing illustrations are a key feature.

(B9) AN ENERGY CURRICULUM FOR THE ELEMENTARY GRADES. Indiana Energy Group, Indiana Department of Commerce, May 1979.

This is a curriculum guide for teaching energy education, and is divided into 3 chapters based on grade level: Energy and You (K-1), Energy and Your Community (2-3), and Energy in Action (4-6). Each chapter contains six lessons organized with a rationale, objective, teacher's instructions, main activity, grade level adaptations, language arts and math adaptations, and student materials.

(B10) A TEACHER'S INTRODUCTION TO ENERGY AND ENERGY CONSERVATION. Elementary. Ohio Department of Education, Columbus, OH.

This document is intended to give the elementary school teacher background information and general suggestions for teaching units and correlated learning activities related to energy and energy conservation. Sections are directed to: A Problem Shared by All, Causes; What is Energy? Energy Sources, Searching for Solutions; Conservation: An Ethic for Everyone; a glossary, and an extensive bibliography.

(B11) ENERGY ACCESS - A GUIDE TO ACTIVITIES AND RESOURCES FOR EDUCATORS. Maine Audubon Society, 118 Route 1, Falmouth, ME 04105.

This book provides teachers with interdisciplinary curriculum activities that focus on energy concepts, and can be integrated into existing curricula. The units contained in the book were developed by Maine teachers and are organized around numbered educational objectives and corresponding activities to meet these objectives.

(B12) ENERGY ACTIVITIES WITH ENERGY ANT. Federal Energy Administration, Office of Communications and Public Affairs, Washington, DC 20461 (28 pages).

Elementary school children will find this booklet an entertaining way to learn more about energy sources and present difficulties. Cutouts, puzzles, riddles, games and pictures to color will stimulate much activity.

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(B13) ENERGY CONSERVATION ACTIVITY PACKET. Iowa Energy Policy Council in cooperation with Iowa Department of Public Information, State Capitol Complex, Des Moines, IA 50319.

This is a series of 5 notebooks for grade levels K-2, 3, 4, 5, 6, written with the goal of developing a lasting conservation ethic in students. Within each notebook are packets containing several interdisciplinary energy conservation exercises and activities to carry out specific objectives. Each packet is organized around an energy concept which focuses on increasing knowledge and an awareness or accomodation concept which deals with clarification of values. Within each packet, teachers will find useful transparencies, posters, and filmstrips that reinforce the energy activities.

(B14) ENERGY CONSERVATION: ELEMENTARY ACTIVITY UNIT. Clifton Halsey and Shelley Swanson, Agricultural Extension Service, University of Minnesota.

This is a unit designed to help teach children to understand more about how and why we use energy, what happens when the supply of energy is less than the demand, and what some possible solutions are. The unit contains four sessions each one hour in length and is designed for use with students nine to twelve years old.

(B15) MY ENERGY BOOK BY ENERGY ANT. Federal Energy Administration, Office of Communications and Public Affairs, Washington, DC 20461 (29 pages).

A colorful story book about energy, its sources, its means of distribution, new power forms, and wise use. Intended for the early elementary grades, teachers can be flexible in the ways they employ the pictures and text.

(B16) FIELD TRIP GUIDEBOOK, Michael F. Tobin, editor. Elementary School Principals Association of Connecticut, Hartford, CT.

This book includes full page descriptions of more than one-hundred museums, organizations, businesses, recreation areas and other attractions in Connecticut, Massachusettes, New York City, Long Island and the Hudson River Valley that may be of interest to children in grades K-8.

(B17) SCIENCE ACTIVITIES IN ENERGY. Department of Energy, Technical Information Center, P.O. Box 62, Oak Ridge, TN 37830 (5 file folders each with 12-16 activity sheets), free.

Developed by the Oak Ridge Associated Universities for ERDA, each folder contains simple exercises and experiments which lead 4th through 6th graders to first-hand understandings of basic energy principles and problems concerning a specific topic. Materials required are usually inexpensive and readily available. Beginning with a question, each activities sheet graphically directs the inquiry to its conclusion with additional ideas included for further exploration. The loose sheet arrangement encourages duplication and facilitates their display. Each folder has supplemental information concerning every activity. All measurements are metric. Individual folder descriptions follow:

SOLAR ENERGY. Activities include solar evaporation, drying, heating, cooking, storage, and electrical conversion.

CONSERVATION. Concentrating on personal energy use, activities involve home ventilation and heat loss, simple thermostats, insulation and differential color absorption, conserving hot water, and automotive efficiency.

CHEMICAL ENERGY. Activities include comparisons of fuel energy contents, by-products of fuel consumption, photochemical requirements and reactions, and synthetic products of fossil fuels.

ELECTRICAL ENERGY. Experiments in this unit emphasize how electricity is manufactured; the use of electricity for motors, electrolysis, electroplating and lighting; and electrical measurement.

WIND ENERGY. This attractive packet offers hands-on activities dealing with uses and problems associated with wind power.

These folders contain a host of enlightening investigations which remain concrete enough to fascinate most elementary youngsters.

(B18) AMERICA'S MARITIME HERITAGE AND ENERGY EDUCATION ACTIVITY BOOK I AND II. Con-Stran Publications, River Park Bldg., Suite 2108, 3600 Conshohocken Avenue, Philadelphia, PA 19008, $3.00.

These booklets emphasize basic skills development and are illustrated with maps, sketches and photographs to provide students with an awareness of the energy crisis and alternatives. Specific lessons focus on sources of oil outside the U.S., energy from the sea, and others.

(B19) A TEACHER'S INTRODUCTION TO ENERGY AND ENERGY CONSERVATION. Secondary. Ohio Department of Education, Columbus, OH.

This document is intended to give the secondary school teacher background information and general suggestions for teaching units and correlated learning activities related to energy and energy conservation. Sections are directed to: A Problem Shared by All, Causes; What is Energy? Energy Energy Sources, Searching for Solutions; Conservation: An Ethic for Everyone; a glossary and an extensive bibliography.

(B20) EIGHT PAGE SPECIAL REPORT ON ENERGY. National Wildlife Federation, 1412 Sixteenth Street, NW, Washington, DC 20036. (8 page booklet, bulk @ 10¢ each).

A balanced exploration of the energy crisis, identifying past abuses and necessary action. Graphic design should encourage students to peruse it more carefully. Appropriate for secondary level.

(B21) ENERGY ACTIVITIES FOR JUNIOR HIGH SCIENCE. A cooperative project of the Minnesota Energy Agency and the Minnesota Dept. of Education, April 1977.

This packet contains six short activities geared to promoting knowledge about energy, providing laboratory experiences, provoking inquiry and relating energy to society through science curriculum. Each activity has background, instructions, and evaluation questions which emphasize sharing and clarification of values.

(B22) ENERGY AND SOCIETY: INVESTIGATIONS IN DECISION MAKING. Biological Sciences Curriculum Study, 1977. Hubbard Publishing, P.O. Box 104, Northbrook, IL 60062.

A nine week high school program in which students discuss basics about energy and possible consequences of energy choices.

(B23) ENERGY CONSERVATION IN THE HOME: AN ENERGY EDUCATION/CONSERVATION CURRICULUM GUIDE FOR HOME ECONOMICS TEACHERS, by Lil Clinard and Nancy Collins. University of Tennessee College of Home Economics (ED 167 413, 302 pages, MF $.83, HC $16.73).

This was designed as a source of information, instructional materials, and suggested references about the energy situation, for infusion into the home economics curriculum.

(B24) ENERGY EDUCATION - A RESOURCE HANDBOOK FOR VOCATIONAL CLASSES. State of Alabama, Department of Education, Division of Vocational Education and Community Colleges, Montgomery, AL 36130.

This is a resource prepared to assist vocational teachers in developing an instructional program on energy and energy conservation in the schools.

(B25) ENERGY, FOOD, AND YOU, Washington State Office of Public Instruction, 1979. Titles and prices from Washington State Office of Environmental Education, Shoreline District Office, NE 158th and 20th Avenue, NE, Seattle, WA 98155.

A program for grades 9 and up on recycling, school gardens, land use planning and solar greenhouses.

(B26) ENERGY FOR 1970 - 1990: A LEARNING EXPERIENCE FOR COASTAL AND OCEANIC AWARENESS STUDIES. No. 315, Project COAST, University of Delaware.

This learning experience is designed to be used as a short introduction to energy studies. Included are background material, classroom discussion ideas, classroom activities, and selected references.

(B27) ENERGY IN AN INTERDEPENDENT WORLD - A GLOBAL DEVELOPMENT STUDIES CASE STUDY, prepared by Anne B. Collier. Available from Global Development Studies Institute, Millbrook School, Millbrook, NY 12645, $5.00.

This publication is a unit for senior high or introductory college level students in which they explore the implications of global interdependence and trace the historical relationship between economic development and energy needs. Included are 90 pages of text plus graphs, references, teachers guide, glossary and bibliography.

(B28) ENERGY & ORDER, M. Terry and P. Witt. Friends of the Earth, 529 Commercial Street, San Francisco, CA 94111.

This is a lesson plan for teaching about energy in the context of a science or civics class. It begins with simple and applicable discussions of entropy, energy uses in the home, city, and industry, and ends with discussions of the social and economic implications of various utility technologies.

(B29) ENERGY: PENNSYLVANIA'S ENERGY CURRICULUM FOR THE MIDDLE GRADES, produced by the Governor's Energy Council and the State Department of Education in Pennsylvania. (ED 164 783, 1977, 217 pages, MF $.83, HC $11.32).

This is an energy curriculum for grades 7-9 containing six modules and a number of activities.

(B30) IDEAS AND ACTIVITIES FOR TEACHING ENERGY CONSERVATION: GRADES 7-12. Jonathan Wert et al, Tennessee University, Knoxville Environment Center, January 1977, 223 pp.

This publication contains a variety of ideas and materials for teaching about energy in grades 7-12. Topic areas include (1) Historical Perspective on Energy, (2) Energy Resources, (3) Energy Conservation, (4) Ideas and Activities, and (5) Appendices. The first three sections provide background information on energy and conservation. The activities include ideas to use in science, social studies, language arts and multidisciplinary areas.

(B31) IMPLEMENTING ENERGY EDUCATION IN FLORIDA'S HIGH SCHOOLS. A Two-Week Credit Institute for Teachers in North Florida, Final Report, Vol. II. Florida State University, Tallahassee, September 1976, 102 pp.

Curriculum units developed by high school teachers are provided for specific content instruction in energy education. The units are categorized by social studies, science, and home economics. The social studies units begin with several activities involving energy vocabulary terms. The science units focus on the technology of biological and physical energy systems. In the home economics units, students learn methods of energy conservation in family life and personal values.

(B32) TEXAS ENERGY EDUCATION FRAMEWORK: A PILOT DRAFT, by B. Elvin and Others. (ED 166 032, 1978, 28 pages, MF $.83, HC $2.06).

This presents a conceptual framework for grades K-12 energy education in Texas. This document was published by Texas Education Agency.

(B33) THE ENERGY CHALLENGE. The Energy Challenge, Box 14306, Dayton, OH 45414. (a booklet of spirit masters with a teacher's guide).

The Federal Energy Administration has developed for students in the fifth through eighth grades a program

structured around 24 ditto masters dealing with general energy use and supplies, fossil fuels, alternative energy sources, energy conservation, and contemporary concerns. Activities included vary from interpreting simple charts and graphs to conducting interviews and solving basic problems. The teacher's guide sorts the activities into units, providing objectives, background information, vocabulary, suggested approaches, and possible extensions for each. With an interdisciplinary focus, some attempt has been made to build logical sequences across several activities. A highly recommended curricular resource.

(B34) YOUR ENERGY WORLD. Department of Energy, Technical Information Center, P.O. Box 62, Oak Ridge, TN 37830. (Four file folders each filled with spirit duplicating masters), free.

The busy upper elementary and middle school teacher will appreciate these ready-for-use curriculum materials. "Your Energy World" consists of four units, each taking three to five classroom periods to complete in addition to home and community assignments. The first unit, "Energy Overview," introduces students to various energy sources, fossil fuels, electrical usage, and current problems through the use of spirit masters possessing teacher directions and correct responses on their non-duplicating surfaces. As in all the units, instructions for employing each activity master are provided on the folder along with suggested additional activities.

The three other units emphasize saving energy through conservation and can be used independently or in conjunction with the overview unit. "Transportation: The Energy Eater" makes students aware of the energy consumption of transporters and what strategies can effectively reduce such use in their families and community. "Energy Use in Homes and Stores" involves children in exploring insulation savings, electrical reliance in the home, the energy requirements of food processing, and an assessment of domestic measures to conserve heat and power. A simulation asks students to role-play in a series of school board meetings which focus their attention upon institutional energy allocations and ways to increase the efficiency of school operations in "Schools Can Conserve Too." A two-sided wall chart is included which describes present and future energy resources and gives tips for energy conservation. Collectively this resource is an attractive project which should be well-received by both students and their teachers.

C. THE ECONOMICS OF ENERGY

(C1) ELECTRICAL ENERGY USE IN THE HOME. National Coordinating Center for Curriculum Development, College of Engineering and Applied Sciences, State University of New York at Stonybrook.

This is a module containing varied activities in which the concepts of energy conservation and transformation are used to study the function and operation of electrical appliances. Although intended to be used as a two week, 10 period mini-course in 9th grade general science, the module is adaptable to supplement existing lessons on electrical power and energy.

(C2) ENCOURAGING SCHOOL TRANSPORTATION EFFECTIVE ENERGY MANAGEMENT. Voluntary Truck and Bus Fuel Economy Program, U.S. Department of Transportation, Washington, DC 20590, free.

This 150 page guidebook which contains a variety of programs and information is designed to be used with the series of booklets entitled "Fuel Economy Through Teamwork." Topics covered include an overview of pupil transportation and energy conservation; purchasing, driving, and operating for better fuel economy; and how to develop and implement a fuel economy management program. These books provide a foundation for pupil transporation conservation plans.

(C3) ENERGY CONSERVATION: AN EXAMINATION OF ENERGY CONSERVATION MECHANISMS AS THEY RELATE TO SCHOOL DISTRICTS IN REGION XI, by Marilyn Kerns. (ED 164 297, 1977, 68 pages, MF $.83).

This is a report which attempts to supply information on energy conservation mechanisms that can be employed in the schools of Minnesota.

(C4) ENERGY CONSERVATION MATERIALS PACKAGE. Colorado Dept. of Education, 201 East Colfax Avenue, Denver, CO 80203.

This is a series of 5 step-by-step guides to developing a district level plan for energy conservation. Topics include Energy Conservation in School Facilities, District Level Plan for Conservation, Energy Conservation in the School Curriculum, and Energy Conservation in School Transportation Systems.

(C5) ENERGY WISDOM - A Packet of Energy Educational materials that has been compiled by the Connecticut Cooperative Extension Service Energy Task Force. Energy Wisdom, University of Connecticut, Storrs, Connecticut 06268, free.

These materials are designed to provide consumers with energy resource materials that will improve energy management practices in and around the home.

(C6) PROJECT WASTE HUNT - YOUR MISSION: ELIMINATE ENERGY WASTE. Critical Mass, P.O. Box 1538, Washington, DC 20013, $1.50.

A citizen's guide to tracking down energy waste, and stopping it.

(C7) PROJECT RETROTECH: INSTRUCTOR'S KIT FOR HOME WEATHERIZATION COURSE. Federal Energy Administration, Washington, DC 20461. (Instructor's guide, student manual, charts, and job book).

This eight hour unit begins with a description of building heat losses, provides methods to compute such losses, and concludes with a four-step analysis of the home weatherization process, including inspection, calculation, evaluation, and installation. Technically oriented, the materials are relevant and provide many opportunities for algorihmic problem-solving. Partial or complete infusion into a senior high physical science course would make the best use of these well organized and integrated booklets.

(C8) SEVEN WAYS TO REDUCE FUEL CONSUMPTION IN HOUSEHOLD HEATING ...THROUGH ENERGY CONSERVATION. Ad Hoc Committee on Fuel Conservation and U.S. Dept. of Commerce, National Bureau of Standards.

This brochure contains several methods for improving personal comfort in the home while at the same time reducing home heating costs.

(C9) SLASH YOUR ENERGY BILLS. Ambiente Environmental Concerns, P.O. Box 13622, San Antonio, TX 78213, $1.35.

This is an energy guide prepared especially for schools, filled with usable energy conservation methods.

(C10) TIPS FOR ENERGY SAVERS. Tips for Energy Savers, Energy Conservation Now, Pueblo, CO 81009. (46 page booklet).

Almost two hundred suggestions for conserving energy in the home, on the road, and at the market place fill this revised and expanded document. The explanations that usually accompany each bit of advice adds greatly to the booklet's value. Suitable for many activities involving secondary students.

(C11) QUESTIONS AND ANSWERS ABOUT ENERGY CONSERVATION IN SCHOOLS. Educational Facilities Laboratories, Inc., 850 Third Avenue New York, NY 10022, free.

Developed by Educational Facilities Laboratories, Inc., this pamphlet is deisgned to alert citizens to the impact of rising energy costs on education.

D. TODAY'S FUELS

(D1) FACTSHEET: COAL. Federal Energy Administration, Washington, DC 20461. (3-page flyer)

Can we mine coal in sufficient quantities? Can we burn the coal? Can we convert coal to other forms of energy? These questions are discussed in a concise manner. Present forms of mining, challenges to restrict coal pollutants, and the present status of coal gasification and liquefaction are described from both an economic and a political perspective. Excellent use in initiating secondary student debates and simulations.

(D2) CLEAN ENERGY FROM COAL. Edison Electric Institute, 90 Park Avenue, New York, NY 10016. (5-page flyer)

Through questions and answers, this publication describes the present use and supply of coal and the difficulties in making clean fuels derived from coal economically feasible and environmentally acceptable. An opener for discussion in secondary grades.

(D3) COAL AND RESEARCH. COAL AND THE ENVIRONMENT. National Coal Association, 1130 Seventeenth Street, NW, Washington, DC 20036. (2 booklets, 18 pages and 10 pages respectively)

These booklets provide very specific information regarding the steps the coal industry is taking in researching new conversion processes and in lessening the environmental impact of coal mining and combustion. Up-to-date teacher references.

(D4) MAP OF COAL AREAS IN THE UNITED STATES. National Coal Association, Coal Building, 1130 Seventeenth Street, NW, Washington, DC 20036. (6-page pamphlet)

A brief description of the supply and location of the four types of coal complement the map provided. Also included is a state by state profile of coal production and demonstrated reserves. A handy reference.

(D5) MINING FOR COAL. USING COAL - MOVING COAL. National Coal Association, Coal Building, 1130 Seventeenth Street, NW, Washington, DC 20036. (2 wall charts)

These two colorful charts depict the methods employed to mine coal at the surface and underground and tell how the fuel is moved to market and eventually used. Profusely illustrated, they help set the tone for secondary units on the utilization of coal and fossil fuels in general.

(D6) FACTSHEET: NEW FUELS FROM COAL #15. National Science Teachers Association, 1742 Connecticut Avenue, NW, Washington, DC 20009. (4-page booklet, free for stamped self-addressed envelope)

Serious economic and ecological issues will need to be resolved as the United States becomes more dependent upon gaseous, liquid, and solid products from coal. This reference provides technical information regarding conversions and projects future patterns of use. A worthwhile summary.

(D7) EXPERIMENTS: PROPERTIES OF GAS AND HEAT ENERGY. Educational Services, American Gas Association, 1515 Wilson Boulevard, Arlington, VA 22209. (book of 31 tear-out duplicating masters, each an experiment)

Appropriate for senior high school students, these experiments might be used in teacher demonstrations, as standard laboratory exercises or in student project work. Each experiment provides all necessary directions.

(D8) THE HISTORY OF NATURAL GAS. Educational Services, American Gas Association, 1515 Wilson Boulevard, Arlington, VA 22209. (16-page booklet)

The history and development of natural gas use is explained in a comic book format. Good introductory material for grades 6-9.

(D9) SCIENCE PRINCIPLES AND GAS APPLIANCES WITH EXPERIMENTS. Educational Services, American Gas Association, 1515 Wilson Boulevard, Arlington, VA 22209. (33-page manual of experiments with transparencies and ditto master)

Five gas appliances are described and their operation is related to several scientific principles. Experiments to illustrate these concepts are outlined and illustrated. This is an excellent resource for secondary school, especially high school physical science classes. The text and organization are exceptional.

(D10) A IS FOR ATOM. Department of Energy, Film Library, P.O. Box 62, Oak Ridge, TN 37830. (16 mm film, 15 minutes)

An excellent teaching film using nuclear principles. Will be best received by students in grades 7-9.

(D11) NUCLEAR ENERGY: SKEPTIC ISSUE # 14. Skeptic Magazine, Inc., 812 Presidio Avenue, Santa Barbara, CA 93101.

This magazine presents articles on nuclear power by some of the biggest names, pro and con, in the field. The articles tend to be short, well written and extremely thought-provoking. Excellent discussion starter.

(D12) NUCLEAR ENERGY. U.S. Department of Energy, Office of Public Affairs, Washington, DC 20585. (10-page flyer)

In a question-and-answer format, this booklet addresses the issues most in the public conscience concerning nuclear power use, safety and future potential as an energy source. A good overview for high school students.

(D13) BASIC PRINCIPLES OF POWER REACTORS. Department of Energy, Film Library, P.O. Box 62, Oak Ridge, TN 37830. (16 mm film, 8½ minutes)

Well organized presentation of the topic, suitable for high school audiences.

(D14) NUCLEAR POWER INFORMATION. Atomic Industrial Forum, Inc. 7101 Wisconsin Avenue, Washington, DC 20014. (11 sheets)

These timely fact sheets provide useful information on all phases of nuclear energy, including uranium supplies, fuel recycling, waste management, reactor safety and licensing, and public acceptance of nuclear power. While AIF is a proponent of expanding the industry, the sheets are sufficiently objective to merit their use in class discussions and problem analysis.

(D15) RADIOACTIVE RADIATIONS AND THEIR BIOLOGICAL EFFECTS, by Peter Lindenfield. American Association of Physics Teachers, Stony Brook, NY. (65-page issues-oriented module, check price list)

While the theme of this unit is the biological applications and hazards of radioactive materials, considerable information concerns radioactive measurement, reactor principles and dilemmas, and effects of electromagnetic radiation. Experimental suggestions and work problems are included. Most profitable for individualized study in high school physics.

(D16) RADIOACTIVE WASTE MANAGEMENT, by Thomas Keenan. American Association of Physics Teachers, Stony Brook, NY. (39-page issues-oriented module, check price list.

Designed for three hours of review, this booklet provides fundamental concepts in radioactivity, describes the ERDA radioactive waste management and treatment program, and analyzes waste production in commercial reactors. Recommended for use as independent study material in high school physics.

(D17) NUCLEAR EXPERIMENTS YOU CAN DO: FROM EDISON. Thomas Alva Edison Foundation, Suite 143, Cambridge Office Plaza, 18280 West Ten Mile Road, Southfield, MI 48075. (32-page booklet of experiments)

Secondary science students should enjoy trying the activities suggested herein. Electroscopes and cloud chambers are built from simple materials to show the presence of nuclear radiation. Models of atoms and chain reactions hold interest. Procedures for building a geiger counter are also included. A fine resource.

(D18) URANIUM: ENERGY FOR THE FUTURE
PLUTONIUM IN PERSPECTIVE
SHIPPING NUCLEAR FUEL
RECYCLING NUCLEAR FUEL
HOW NUCLEAR PLANTS WORK
NUCLEAR REACTOR SAFETY
MANAGING NUCLEAR WASTE
INSURING NUCLEAR RISKS
PROTECTING NUCLEAR POWER PLANTS
THE SAVINGS WITH NUCLEAR ENERGY. Atomic Industrial Forum, Inc., Public Affairs and Information Program, 7101 Wisconsin Avenue, Washington, DC 20014. (All are 6-page flyers)

These ten brief booklets provide clear, concise discussion of nuclear fuels, reactor operation and safety, the management of wastes, economic benefts and protection against accidents or sabotage. Constituting fine background reading for teachers and senior high students, their use in preparation for panel discussions and debates is strongly recommended.

(D19) PUBLICATIONS AND MATERIALS: 1978. American Petroleum Institute, Publications and Distributions Section, 2101 L Street, NW, Washington, DC 20037. (171-page booklet)

A guide to hundreds of free and low-cost materials dealing with the marketing, production, refining and transportation of oil. Sections on environmental affairs, statics, public relations, and medicine are also included. Worth sending for if you plan to teach a detailed unit on oil.

(D20) NATIONAL WILDLIFE, V.II No.5, August - September, 1973. "The Fascinating Story of Fossil Fuel," Isaac Asimov.

Understanding the 65 million year process that made these fuels. Gives the current energy crisis new dimension. The colorful pictoral charts make excellent teaching aids.

(D21) FACTS ABOUT OIL. American Petroleum Institute, 2101 L Street, NW, Washington, DC 20037. (44-page booklet, $.35 each)

A very comprehensive non-technical source of information concerning oil, history, the discovery-production-refining cycle, marketing and research, and oil's role in the energy crisis. Can be used as a senior high text or reference for project work. There is not a wasted sentence in this booklet.

(D22) DISTILLATION. American Petroleum Institute, 2101 L Street, NW, Washington, DC 20037. (wall chart, $.10 each)

The chart depicts the process of distillation in oil refineries. Refining and petrochemicals are discussed on the back of the chart. Useful in senior high physical science classes.

(D23) OIL, William W. Eaton. ERDA, 1977. (free)

Present and future production of oil is considered in relation to growing demand and decreasing supplies.

(D24) LARGE TANKERS: OUR ENERGY LIFELINES. Mr. V.K. Leonard, Director, Transportation Department, American Petroleum Institute, 2101 L Street, NW, Washington, DC 20037. (22-page booklet, single copies free)

A most interesting look at VLCC's or Very Large Crude Carriers. Economic and construction details are provided along with the safety measures employed. A fascinating addition is a cross-section of a VLCC with a 78-item key. A comparison of tanker leakage to natural oil sources will surprize the reader. Recommended for senior high school students.

(D25) OIL. Shell Film Library, 1433 Sadlier Circle, West Drive, Indianapolis, IN 46239. (16mm film, 18 minutes)

This film surveys the oil industry, beginning with oil's

formation and entrapment in sedimentary rock layers. The location of reservoirs through seismic research and subsequent drilling operations are shown for both onshore and offshore fields. Transport, refining and manufacture of oil-based products are also addressed. A fine introductory movie for secondary students.

(D26) WOOD HEAT, John Vivian. Rodale Press, 1976. ($4.95 paperback)

A very complete presentation of wood-heating stoves and fireplaces. The environmental and economic aspects of harvesting and burning wood as an alternate fuel are given thorough coverage. Fire safety, along with stove, fireplace and chimney repair are covered. Bibiliography and manufacturers included.

E. FUTURE FUELS

(E1) MAGNETIC FUSION. U.S. Department of Energy, Office of Public Affairs, Washington, DC 20585. (10-page booklet)

A brief introduction to nuclear fusion and how successful efforts to contain the plasma will contribute to the solution of scarce fossil fuel reserves. Senior high.

(E2) THE ULTIMATE ENERGY. Department of Energy, Film Library, P.O. Box 62, Oak Ridge, TN 37830. (16 mm film, 28 minutes)

For over twenty years, physicists have attempted to duplicate the thermonuclear fusion reactions of the sun in the laboratory. Such an accomplishment will provide considerable energy for the next century. This film uses models, animation and on-site interviews to explore the fusion research problems and progress in the design of magnetic bottles and laser technologies. With a highly complex subject, the presentation succeeds in explaining fusion principles to high school students in a intriguing manner.

(E3) UNDERGROUND FURNACES: THE STORY OF GEOTHERMAL ENERGY, Irene Kiefer. Morrow Jr. Books, 105 Madison Avenue, New York, NY 10016, 1976. (64 pages, $4.95)

A good brief introduction to geothermal energy. Diagrams, glossary and teacher backgrounds are included.

(E4) GEOTHERMAL - THE ROARING SOURCE. California Department of Water Resources, P.O. Box 388, Sacramento, CA 95802. (16 mm film)

In the United States, the major geothermal power plants are located at a steam field in northern California known as the Geysers. While focused largely upon this facility, this film is probably the best presently available on the subject. Excellent instructional design.

(E5) GEOTHERMAL - NATURE'S BOILER. Department of Energy, Film Library, P.O. Box 62, Oak Ridge, TN 37830. (16 mm film, 7¼ minutes)

A timely presentation on the contemporary use and potential of geothermal heat energy for electrical generation and space and water heating. The large field in northern California is emphasized. Most appropriate for senior high school.

(E6) GEOTHERMAL ENERGY, William Eaton. Department of Energy, Office of Public Affairs, Washinton, DC 20585. (42-page booklet)

Few will find a finer introduction than this non-technical and well-written booklet. Dr. Eaton explains the origin of geothermal energy and gives a brief history of its use throughout the world. A fairly extensive chapter on the technology of the energy source contrasts the extraction of heat from dry-steam and wet-steam wells and cites the potential importance of dry hot rock for more universal applications. The newest techniques are also treated. Economic and environmental effects of expanded geothermal exploration and development complete the text. Photos and illustrations complement the presentation. Highly recommended for high school student and teacher reference.

(E7) GEOTHERMAL ENERGY: PROSPECTS AND LIMITATIONS. November/December, 1976 issue of the SIERRA CLUB BULLETIN. (article)

Hamilton Hess provides a non-technical perspective of the electrical generation capacities of present and planned geothermal systems and the environmental difficulties associated with their development. The "limitations" cited help to balance the claims of the overly zealous. Worthwhile background reading.

(E8) TO BOTTLE THE SUN. Department of Energy Film Library, P.O.

Box 62, Oak Ridge, TN 37830. (16 mm film, 5½ minutes)

A short but excellent introduction to fusion nuclear reactors suitable for students in grades 11 and 12.

(E9) DESIGNING AND BUILDING A SOLAR HOUSE; YOUR PLACE IN THE SUN, Donald Watson. Garden Way Publishing Company, 1977. ($8.95 paperback)

A very complete reference on solar homes. Necessary information on climate, collector design, active and passive heating systems, conservation and construction costs. Numerous appendices provide reference. Extensive illustrated lists of solar homes in the U.S. and solar designers and design calculations.

(E10) ENERGY AND SOLAR HEATING. Frank C. Bason, American Association of Physics Teachers, Stony Brook, NY 11794. (54-page issues-oriented module)

This is an excellent resource for independent study of students adept in physics. The concepts of energy, work, heat and power are developed mechanically and applied to solar radiation. A lab exercise concerned with measuring the intensity of sunlight through use of a solar calorimeter is described. The final series of lecture notes deal with solar heating systems. Exercises and problems are distributed throughout the booklet. Sophistication restricts its use to advanced secondary course work.

(E11) ENERGY FROM THE SUN, Melvin Burger. Thomas U. Crowell Publishers, 666 Fifth Avenue, New York, NY 10019, 1976. (33 pages, $5.95)

Background information on very simple concepts about the sun's energy.

(E12) ENERGY: THE SOLAR PROSPECT (WORLDWATCH PAPER II), Dennis Hayes. Worldwatch Institute, 1776 Massachusetts Avenue, NW, Washington, DC 20036, 1977. (80 pages, $2.00)

This presents a coherent case for solar alternative energy development, including wind, photovoltaic cells, hydro and bio mass. Background and footnotes included. Well-written, fascinating reading.

(E13) HARNESSING THE SUN: THE STORY OF SOLAR ENERGY, David C. Knight. Morrow Jr. Books, 105 Madison Avenue, New York, NY

10016, 1976. (128 pages, $5.95)

Introduction to solar principles and possibilities. Clearly stated, contains many diagrams and a glossary.

(E14) SOLAR DWELLING DESIGN CONCEPTS, U.S. Department of Housing and Urban Development. Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402. (146-page book, $2.30)

This profusely illustrated book is well worth the expense. In addition to providing details on solar components and systems, this volume goes further in describing the environmental and architectural conditions that influence the design of solar dwellings. Planning of the site is analyzed and solar applications to traditional and advanced housing designs are given to exemplify the principles discussed. A very intriguing reference book.

(E15) SOLAR ENERGY, William W. Eaton. Department of Energy, Office of Public Affairs, Washington, DC 20585. (49-page booklet)

The Department of Energy publishes a number of introductory pamphlets on solar energy but this seems the most complete. Solar heat and electricity are given extensive non-technical discussions with supporting diagrams and photos. One chapter is devoted to the conversion of solar energy into various fuel types. A bibiliography and useful appendices are included. An interesting teacher resource.

(E16) SOLAR ENERGY AND YOUR HOME. U.S. Department of Housing and Urban Development, National Solar Heating and Cooling Information Center, P.O. Box 1607, Rockville, MD 20850. (20-page booklet)

Through a question-and-answer format, this pamphlet introduces the reader to basic principles and design of solar space heating and hot water systems. Considerable referral sources are provided. A reading list is also included.

(E17) SOLAR ENERGY FROM PHOTOVOLTAIC CONVERSION. U.S. Department of Energy, Office of Public Affairs, Washington, DC 20585. (9-page booklet)

Chemistry and physics students will find this a well-written introduction to the use of solar cells to provide

electricity to serve many unique needs (oceanic buoys, two-way radios, space vehicles). The technical and economic promise for expanded use in many more applications is emphasized.

(E18) THE NATIONAL SOLAR HEATING AND COOLING INFORMATION CENTER. P.O. Box 1607, Rockville, MD 20850. (Call 800-523-2929)

The center's prime purpose is to disseminate information concerning the application of solar energy to heating and cooling. Both general and technical data are supplied, as well as speaker referrals and exhibits.

(E19) CATCH THE WIND: A BOOK OF WINDMILLS AND WINDPOWER, Dennis Landt. Four Winds Press, Box 126, Bristol, FL 32321. (114 pages, $7.95)

(E20) WIND MACHINES, Frank R. Eldridge. Report for the National Science Foundation, 1975, Serial No. 038-000-00272-4. (77 pages, $2.00)

Good introduction to all aspects of wind energy, profusely illustrated.

(E21) WIND ENERGY. NYSE&G NOTES, Volume 2, February 1978. Consumer Education Programs, New York State Electric and Gas Corporation. Binghamton, NY 13902. (4-page leaflet)

(E22) WIND ENERGY BIBILIOGRAPHY, 2nd edition. Windworks, Box 329, Route 3, Mukwonago, WI 53149. (70 pages, $3.00)

(E23) WIND AND WINDSPINNERS: A "NUTS 'N BOLTS APPROACH TO WIND-ELECTRIC SYSTEMS, Michael A. Hackleman. Earthmind, 5246 Boyer Road, Mariposa, CA 95338, 1975. (140 pages, $8.00)

How-to-do-it approach for a simple, electricity generating windmill.

(E24) WIND-CATCHERS: AMERICAN WINDMILLS OF YESTERDAY AND TOMORROW, Volta Torey. Stephen Green Press, Brattleboro, VT 05301, 1976. (226 pages, $12.95).

Covers the history of windmills back to the Colonial period, survey of current developments.

(E25) WIND ENERGY SYSTEMS, Agricultural Engineering Extension Bulletin #413. Department of Agricultural Engineering, New York State College for Agriculture and Life Sciences, Ithaca, NY 14853. (9-page booklet)

(E26) SIMPLIFIED WIND POWER SYSTEMS FOR EXPERIMENTERS, Jack Park. Earthmind, 5246 Boyer Road, Mariposa, CA 95338, 1975. (80 pages, $6.50)

A simplified engineering handbook for the design and construction of wind machines.

(E27) MOTHER EARTH NEWS HANDBOOK OF HOMEMADE POWER. Mother Earth News, P.O. Box 70, Hendersonville, NC 28739. (374 pages, $1.95)

Includes chapter on wind energy systems.

(E28) THE HOME BUILT, WIND-GENERATED ELECTRICITY HANDBOOK, Michael A. Hackleman. Earthmind, 5246 Boyer Road, Mariposa, CA 95338, 1975. (194 pages, $8.00. Companion volume to the author's Wind and Windspinners)

(E29) ENERGY FROM THE WINDS. U.S. Department of Energy, Office of Public Affairs, Washington, DC 20585. (6-page flyer)

A brief look into the history, present techniques and limitations of harnessing wind energy for electrical power. Introduces high school students to the field.

(E30) ENERGY FROM THE WIND: ANNOTATED BIBILIOGRAPHY, Barbara L. Burke & Robert N. Meroney. Colorado State University, Engineering Research Center, Publications Department, Fort Collins, CO 80523. (350 pages, $15.00. Includes the basic volume, August 1975, plus the April 1977 supplement)

(E31) HARNESSING THE WIND FOR HOME ENERGY, Dermot McGuigan. Garden Way Publishing Company, 1978. ($4.95)

Tells how to measure the wind potential of a site, methods for figuring costs and pay-back. Includes annotated lists of manufacturers, restorers and agents. Bibiliography.

(E32) ALTERNATIVE SOURCES OF ENERGY, Sandy Eccli. Seabury Press, 815 Second Avenue, New York, NY 10017, 1975.

Contains information on building or refining backyard-type energy systems. A sourcebook in style and format of the Whole Earth Catalogue.

(E33) ENERGY: ITS PAST, PRESENT AND FUTURE, Martin J. Gutnik. Children's Press Inc., 1224 West Van Buren, Chicago, IL 60607, 1975. (48 pages, $4.95)

Contains background information, diagrams, glossary. A good simple look at sources of energy.

(E34) ENERGY TEACHING CENTERS: ONE GOOD WAY TO EXPLORE ALTERNATIVES. Lois E. Kenick, Volume 43, Number 5, The Science Teacher.

Winner of the Gustav-Ohaus-NSTA Award for 1976, this excellent article prescribes the establishment of community-based Energy Teaching Centers which could serve as communication and dissemination vehicles for energy conservation techniques and projects. Given special attention is the development of demonstration models which would give visitors hands-on experiences with alternative power sources. Many fine ideas for local application.

(E35) FACTSHEETS #1 - #19. National Science Teachers Association, 1742 Connecticut Avenue, NW, Washington, DC 20009. (19 titles, $1.00 handling charge)

These pamphlets give authoritative and balanced information on the state of the art in such sources as plant bioconversion, solar, wind, geothermal, breeder and fusion reactors, coal conversions and storage technology. Two fact sheets are devoted to a glossary of terms and an extensive bibiliography. The reference value of such summaries for projects and discussions in senior high is inestimable.

(E36) OCEAN THERMAL ENERGY CONVERSION (6-page flyer)
FUELS FROM BIOMASS (4-page flyer)
FLYWHEELS: STORING ENERGY AS MOTION (7-page flyer)
GAS TURBINES FOR EFFICIENT POWER GENERATION (9-pager flyer).
U.S. Department of Energy, Office of Public Affairs, Washington, DC 20585.

AGENCIES PROVIDING STAFF DEVELOPMENT AND RESOURCE PEOPLE

Staff Development Programs in Energy Education for teachers are available from a wide range of agencies and individuals. This section provides a selected list of the individuals and agencies available for this purpose. Individual contact should be made for determining specific topic, availability and cost, if any, for programs. In addition, these agencies and individuals are good contacts to find resource persons or specific energy issues.

William Stearns
Windham High School
355 High Street
Willimantic, CT 06226
(423-8401)

Les Corey
Connecticut Audubon Society
2325 Burr Street
Fairfield, CT 06430
(259-6305)

Larry Schaefer
ACES
800 Dixwell Avenue
New Haven, CT 06511
(562-9967)

George Atamian
Talcott Mountain Science Ctr.
Montevideo Road
Avon, CT 06001
(677-8571)

Sr. Claire Markham
St. Joseph College
1678 Asylum Avenue
West Hartford, CT 06117
(232-4571)

John Kwasnoski
Solar Ed. Coop.
1627 Litchfield Tpke.
Woodbridge, CT 06525
(624-5151)

Leonid Azaroff
Physics Dept.
University of Connecticut
Storrs, CT

William Murphy
United Illuminating
80 Temple Street
New Haven, CT 06506
(777-7981)

Pat Krukowski
Environmental Education Center
ACES
800 Dixwell Avenue
New Haven, CT 06511 (562-9967)

Robert Amrein
Talcott Mountain Science Center
Montevideo Road
Avon, CT 06001
(677-85-71)

Frank Salomon
St. Joseph College
1678 Asylum Avenue
West Hartford, CT 06117
(232-4571)

Lawrence Kershner
New Milford High School
25 Sunny Valley Road
New Milford, CT 06776
(354-3936)

Dr. Harry O. Haakonsen
Southern Connecticut State College
501 Crescent Street
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CONNECTICUT STATE DEPARTMENT OF EDUCATION

Dr. Sigmund Abeles
Connecticut State Department of Education
P.O. Box 2219
Hartford, CT 06115
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FIELD TRIP SITES

1. Locations of Connecticut wind energy conversion systems.

Winsted presently lights a portion of its town garage with a wind machine. It is a North Wind system and has a rated output of three kilowatts at 27 mph. Groups may visit after January 1, 1980.

Contact: Mr. Francis Kane
Public Works Department
Winsted, Connecticut 06098
(379-4101)

A private residence in Bloomfield derives a portion of its electricity from a Jacobs machine which has a rated output of 1.8 kilowatts at 20 mph.

Contact: Mr. and Mrs. Bernie Gostyla
51 West Street
Bloomfield, Connecticut 06002
(242-1374)

2. Locations of Connecticut wood-fired facilities.

The Pratt Read Company is a wood waste fuel operation which manufactures piano action parts. They allow small groups to tour the plant during the day.

Contact: Mr. Gilbert Nichols, Plant Engineer
Pratt Read Company
Ivoryton, Connecticut 06442
(767-8282)

The Berrol USA Company is a wood-fired facility which manufactures pencils. Students over twelve years old are allowed to tour the plant and also view the pencil-making process. Students under twelve years old are shown a film and meet the plant engineer.

Contact: Mr. Jack Miller or Mr. Frank Ketchum
Berrol USA Company
Danbury, Connecticut 06810
(744-0000)

By February 1980, The Rossi Corporation will be burning sawdust waste in a wood stove which will convert water into steam to run some of their equipment.

Contact: Mr. Ted Rossi

The Rossi Corporation
Higgganum, Connecticut 06441
(345-4561)

3. Locations of hydroelectric power facilities.

Northeast Utilities operates eight hydroelectric stations on Connecticut with a combined generated capacity of approximately 100 megawatts. All but one are located on the Housatonic River. It also operates a 31-megawatt pumped-storage project in New Milford. Facilities accessible to the public and appropriate contact persons are as follows:

Falls Village - A three-unit station on the Housatonic at Falls Village with a capability of 10,200 kilowatts.

Shepaug - A single-unit station on the Housatonic at Southbury with a capability of 47,000 kilowatts.

Contact: Mrs. Nell Radke
Northeast Utilities
250 Freight Street
Waterbury, Connecticut 06720
(753-0131 X 297)

Bulls Bridge - A six-unit station on the Housatonic at Gaylordsville with a capability of 8,000 kilowatts.

Rocky River - Pumped-storage project on the Housatonic at New Milford.

Stevenson - A four-unit station on the Housatonic at Monroe with a capability of 28,700 kilowatts.

Contact: Mr. George Breitweiser
Northeast Utilities
P.O. Box 1337
Stamford, Connecticut 06094
(325-4381 X 261)

Tunnel - A two-unit station of the Quinnebaug at Preston with a capability of 2,000 kilowatts.

Contact: Mrs. Marilyn Brossmer
Northeast Utilities

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48 Tolland Stage Road
Tolland, Connecticut 06084
(872-8335 X 437)

One of the earliest hydroelectric stations in the country is situated on the Farmington River in the Rainbow section of Windsor. A two-unit station with an 8,000 kilowatt capability, it is operated by the Farmington River Power Company. A fish ladder has been constructed at this site as a part of a project to encourage the return of salmon and shad to the Connecticut River. The fish are most apt to be seen between early April and mid-June.

Contact: Mr. Irving Hartmann
P.O. Box 276
Poquonock, Connecticut 06064
(688-2156)

The City of Norwich, located on the Shetucket River, operates several hydroelectric facilities. Visitors are welcome at the Occum station. The city also operates a jet turbine facility, a reservoir and a new sewage treatment plant.

Contact: Mr. Charles Rossoll or Mr. Albert Nystrom
Electric Production Division
Public Untilities Department
34 Shetucket Street
Norwich, Connecticut 06360
(887-2555 X 254, or X 256)

4. Locations of nuclear generating facilities.

Connecticut Yankee Information Center

The Connecticut Yankee facility provides educational displays on electricity, solar energy, conservation, nuclear energy and advanced energy concepts. Many exhibits incorporate "hands-on activites" and they have a 100-seat auditorium featuring films.

Contact: Connecticut Yankee Energy Information Center
Haddam Neck
Rural Route #1, Box 127F
East Hampton, Connecticut 06424
(203) 267-9279

5. Locations of wood-burning stove shops.

Various types of wood-burning stoves can be viewed and resource people are available to comment on their use, efficiency and different aspects involved when burning wood.

Contact: Jim Bidwell
40 Main Street
East Hartford, Connecticut 06115
(568-8838)

Or contact: Your nearest fireplace and stove shop

6. Locations of Connecticut's air-quality monitoring stations.

Tours of the DEP air-quality monitoring stations measuring pollutants emitted by the combustion of fossil fuels are available throughout the state. The DEP in Hartford also allows students to view the meteorology station which predicts air pollution levels, and a computer system which analyzes air-quality data received 24 hours a day.

Contact: Bob Sargis
Air Compliance Unit
Department of Environmental Protection
State Office Building
Hartford, Connecticut 06115
(566-2269)

7. Talcott Mountain Science Center: a private educational and research organization located on 1,000-foot high Talcott Mountain in Avon, Connecticut. Among several other science areas enhanced by the mountain-top location, the Center has an 8,000-square foot solar heated facility which houses an alternate energy and appropriate technology laboratory. Students and teachers get a firsthand view of a functioning science facility designed and constructed with both active and passive solar heating in mind. In addition to activities and tours of the laboratory, the Center also has an experimental thermosiphoning Trombe Wall and a solar heated RADAR laboratory. Groups can also use the Science Center's various telescopes to observe the sun, its surface and eruptive prominences. Recommended for elementary, secondary, college, and teacher groups. Call 677-8815 for more information.

8. Locations of solar heating, cooling, or electrical generating facilities in Connecticut.

Tours of a solar heated building, a hallway heated by

a wind generator, and rooms heated with heat reclaimed from a computer are offered to students by the Telephone Company in New Haven, Connecticut. A large appropriate energy exhibit, including a computer which calculates the cost advantages of carpooling, can be borrowed on a weekly basis.

Contact: Shirley Belcher
Southern New England Telephone Company
New Haven, Connecticut
(771-5922)

9. An "Energy Mobile" containing energy displays and programs is available to area schools. The show centers on how individual needs and choices determine the amount of energy used (or saved) in the home or on the road.

Contact: John W. Keenan
College of Engineering
University of Hartford
200 Bloomfield Avenue
West Hartford, Connecticut 06117

MODEL PROGRAMS

Schools in Connecticut are rapidly responding to the challenge of energy issues in their respective programs. This list of model programs is selected as an example of programs occurring throughout Connecticut. No attempt has been made to be comprehensive. However, the Connecticut State Department of Education is interested in knowing of programs in each district. Send descriptions of your program to Dr. Sig Abeles, CSDE, Box 2219, Hartford, CT 06115.

ELEMENTARY LEVEL

Power Quiz (6th Grade) Power Quiz is an energy education program which introduces sixth graders to basic energy concepts and helps them develop energy conservation skills to use daily. Power Quiz is a complete program for 15 - 1/2 hour classes. The kit contains teacher guides, student workbooks, two filmstrips/tapes and more. The program is sponsored by United Illuminating for every 6th grade classroom in their service territory. Contact: William Murphy, United Illuminating, 80 Temple Street, New Haven, CT 06506. (777-7981)

Energy Unit (5th Grade) Variety of energy projects are woven into relevant sections in science/social studies areas (e.g. wind projects are incorporated into weather, fossil fuels into geography). Contact: Doug Lumpkin, Northeast School, 530 Stevens Street, Bristol, CT 06010. (584-7839)

Upper Elementary Unit (6th Grade) Energy is woven into both science and health education in an eight-week unit which includes hands-on projects and will culminate in an energy fair. Contact: Joanne Babic, Norfeldt School, 35 Barksdale Road, West Hartford, CT 06117. (233-4421)

JUNIOR-SENIOR HIGH LEVEL

Energy-Environment Simulator (7-12 Grades) Using an Energy-Environment Simulator (a portable analog computer), students explore alternative futures of their own design by varying type and amount of energy sources and consumption. The Simulator is available on a free loan basis to teachers throughout the state. The only prerequisite is that teachers receive a brief training in simulator use and care. Contact: Dr. Harry O. Haakonsen, Southern Connecticut State College, 501 Crescent Street, New Haven, CT 06511. (397-4353)

Appropriate Technology (K-Adult) Talcott Mt. is a non-profit educational facility providing classes and tours for people of all ages in solar energy and other appropriate technologies. The facilities include a solar heated and energy efficient building with a separate solar hot water system, a passive Trombe wall system in another building, and other in-place collector systems. Also available are a fully equipped weather station and telescopes used for solar observation. Contact: George Atamian, TMSC, Montevideo Road, Avon, CT 06001. (677-8815)

Energy Unit (7-8 Grades) Developed a quarter (10 weeks) energy unit to be pilot tested this winter, using an existing free-standing greenhouse and to be built passive and active solar systems. Contact: Doug Brozinski, West Woods School, Charles Street Ext., Bristol, CT 06010. (584-7832)

Solar DHW and Greenhouse Demonstrations (9-12 Grades) Has solar heated domestic hot water system installed as a demonstration, installed by students, faculty and custodian. Is now integrating its use into various courses. Has a nine year old 1000 ft^2 free-standing greenhouse used in biology and plant science courses. Attempting to make better use of and reduce heat losses and use of conventional fuel. Contact: Dr. E. Dan Cappel, Wilton High School, 395 Danbury Road, Wilton, CT 06897. (762-0381)

Field Trip to Alternate Energy Facilities (7-12 Grades) Has developed a weekend field trip to alternate energy sources in Vermont and Connecticut. Three or four teachers take 18-20 students in vans for $35 each, sleep in state parks. Contact: Clayton Barton, Hamden High School, 2040 Dixwell Avenue, Hamden, CT 06514. (248-9311)

Films, Filmstrips (9-12 Grades) Variety of films and filmstrips may be borrowed from Norton-Peck Library. Recent additions in energy field include: "Energy - The Fuels of Man" and "Energy - The Problems and The Future" (both National Geographic films), and "Energy from the Day Star" (Exxon). Contact: David Anderson Norton-Peck Library, Norwich Free Academy, 305 Broadway, Norwich, Ct 06360. (887-2505)

Energy: Supplies and Options (9th Grade) Within the context of an earth science course, students research an energy source of their choice and share their findings with the class. They then consider ways in which supply and demand might be brought into balance and are encouraged to submit their suggestions to someone in a position to convert ideas into action at the school, town, state or national level. Contact: Carol Wilson, Sheehan High School, Hope Hill Road, Wallingford, CT 06492. (265-2071)

Building Audits (9-11 Grades) Students with a particular interest in energy conservation have participated in an energy audit conducted by Connecticut's Energy Extension Service through the Department of Administrative Services, and with this training and some assistance from persons in that Department, have gone on to do an energy audit of a nearby middle school. Like other audits in this program, theirs has analyzed building structure and utility costs, energy losses, and the potential and cost of changes which would cut these losses. Contact: Carol Wilson, Sheehan High School, Hope Hill Road, Wallingford, CT 06492 (265-2071)

Energymobile (9-12 Grades) Programs available to area schools which show how individual needs and choices determine the amount of energy used (or saved) in the home or on the road. Contact: John W. Keenan, University of Hartford, College of Engineering, 200 Bloomfield Avenue, West Hartford, CT 06117. (243-4847)

A LISTING OF INVENTORY REFERENCES BY SUBJECT MATTER, GRADE LEVEL AND TOPIC AREA

The following pages contain a cross reference chart or matrix to assist in finding a resource which refers to a particular subject area, topic and grade level. To use the matrix first select the page with the appropriate grade level i.e. K-3, 4-6, 7-9 or 10-12. Then select the subject area from the column on the left i.e. science, social studies, language arts or mathematics. Read across the top to find the topic of interest such as Energy the Concept, or Energy Uses. The box below will contain a code letter and number e.g. B4, D5, E27 which refers to a resource in the body of the text. For example, B4 refers to Energy Awareness Education which appears on page 6.

The matrix should give assistance in identifying a reference for a desired subject, topic and grade level.

K-3 ENERGY TOPICS / SUBJECT	ENERGY THE CONCEPT	ENERGY SOURCES	ENERGY USES	ENERGY CONSERVATION	ENERGY AND ECONOMICS	ENERGY AND THE ENVIRONMENT
SCIENCE	B1, B3, B4, B5, B7 B8, B9, B10, B11 B12, B13, B15, B16 B32, E3, E6, D3 D5, E7, E11, E17 E13, E14, D18, E15 D20, D26, D33, E34	B1, B3, B4, B7 B8, B9, B10, B12 B15, B16, E3, E6 D5, E7, E11, E12 E13, E14, E15, D20, E19, E20 E21, E22, E24 E25, E27	B4, B5, B8, B9 B10, B12, B13 B15, B16, B32 E3, D5, E6, E7 E11, E12, E13, E14, E15, E19, E20, E21, C1, E24, E25, E27	B1, B2, B5, B7 B8, B9, B10, B12 B13, B15, B32, D5 C1, C2, C3, C9	B2, B7, B32, D5 E6	B13, D3, E6, E7 E14
SOCIAL STUDIES	B9, B32, E6, E7 E14	B7, B9, E6, E7 E14, E24	B9, B32, E6, E7 E14, E24, C1	B2, B3, B4, B5 B7, B9, B10, B11 B13, B32, C1	B2, B4, B32, E6	B13, E6, E7, E14
LANGUAGE ARTS	B8, B9, B10, B15 D18	B8, B9, B10, B15	B8, B9, B10, B15	B8, B9, B10, B15		
MATH	B9	B9	B9	B9		

4-6 ENERGY TOPICS / SUBJECT	ENERGY THE CONCEPT	ENERGY SOURCES	ENERGY USES	ENERGY CONSERVATION	ENERGY AND ECONOMICS	ENERGY AND THE ENVIRONMENT
SCIENCE	B3, B5, B8, B9 B10, B11, B12 B13, B16, B17 B34, B32, E3, E6 E7, E11, E12, D5 D14, E13, E14 D18, D19, E15 D20, D22, D26 D33, E34, E29	B3, B4, B5, B8 B9, B10, B11 B12, B13, B16 B17, B34, E3, D4 E6, E7, E11, E12 D5, E13, D16, E14, E15, D20 E19, E20, E21 E22, E24, E25 E32, E31, E27	B3, B4, B8, B9 B10, B12, B13 B14, B16, B17 B34, B32, E3 E6, E7, D5, E11 E12, E13, E14 E15, E19, E20 E21, E24, E25 E27, C1	B2, B3, B4, B5 B8, B9, B10, B12 B14, B17, B34 D4, C1, C2, C8 C9,	B2, B3, B34, B32 D4, D5, E6, D23	B32, E6, E7 E14
SOCIAL STUDIES	B6, B9, B32, B34 E6, E7, E14	B6, B9, B11, B34 D4, D5, D6, E7 E14, E24	B6, B9, B32, B34, E6, E7 E14, E24, C1	B2, B3, B4, B9 B10, B11, B13 B34, B32, C1	B2, B3, B5, B13 B14, B32, B34 D4, E6	B5, B32, E6, E7 E14
LANGUAGE ARTS	B8, B9, B10, B34 D18	B8, B9, B10 B34	B8, B9, B10 B34	B4, B8, B9, B10 B11, B13, B34	B34	
MATH	B9, B34	B5, B9, B34	B9, B34	B4, B9, B11 B34	B3, B5, B34	

7-9 ENERGY TOPICS / SUBJECT	ENERGY THE CONCEPT	ENERGY SOURCES	ENERGY USES	ENERGY CONSERVATION	ENERGY AND ECONOMICS	ENERGY AND THE ENVIRONMENT
SCIENCE	B19, B21, B22 B16, B34, B29 B32, E13, E14, D1 D2, D1, E2, E3 E4, E5, E6, D5 D6, E7, D8, D10 D11, E12, D14, D15, E15, E18 E29, D17, D18 D19, D20, D22 D26, D33, E34 E35	B3, B4, B5, B19 B20, B22, B16 B18, B29, B34 B30, B32, B33 E1, E2, D1, E4 E5, D4, E6, D5 D6, E7, D8, D10 E11, D12, E12 E13, E14, E15 D20, E18, E19, E36 E20, E21, E24, E35 E25, D25, E27, E32 E28, E22, E30, E31	B3, B21, B23, B16 B29, B34, E1, E2 E3, E4, E5, E6, E7 D5, D6, D8, E11 E12, E13, E14, E15 E16, E18, E19, E20 E23, E21, E24, E25 E26, E31, E27, E28 C1	B1, B2, B3, B4, B7 B19, B21, B23, B29, B30, B32 B34, B33, D2, D23 C1, C2, C3, C4, C6, C8, C9, C10 C11	B2, B3, B5, B21 B23, B29, B34 B32, D1, E6, D4 D5, D6, D23, D24 C2, C3, C4	B20, B22, B23 B29, B32, B33 D2, E6. D6, E7 D16, E14, D24 C6
SOCIAL STUDIES	B6, B34, B32, D1 D2, E6, D5, D6 E7, E14, D6, D8 D11, D18, D23	B6, B20, B18 B30, B34, B32 B33, D4, E6, E7 E14, D5, D6, D12 E24	B3, B6, B23, B34 B33, B32, E6, E7 E14, E24	B2, B3, B7, B23 B30, B34, B32 B33, C2, C3	B1, B2, B3, B4 B5, B23, B34, B32 B33, D1, E6, D4 D6, [illegible], C3	B1, B5, B23, B3[illegible] D2, E6, D6, E7 E14, C6
LANGUAGE ARTS	B34, D1, D2, D18	B33	B3, B34	B34, B33	B4, B34	
MATH	B34, E18	B5, B34, B33 E18	B23, B34, E18	B4, B7, B23, B34	B3, B5, B7, B34 B33	

10-12 ENERGY TOPICS / SUBJECT	ENERGY THE CONCEPT	ENERGY SOURCES	ENERGY USES	ENERGY CONSERVATION	ENERGY AND ECONOMICS	ENERGY AND THE ENVIRONMENT
SCIENCE	B5, B19, B22, B25, B31, B32 E13, D1, E1, D2 E2, D3, E3, E4 E5, D7, E6, D5 D6, D7, E8, D8 D9, D10, E10,E11 D11, D13, E12 D15, D14, E14 E15, E17, E18 D17, D18, D19 D20, D26, D33 E34, E35, E29	B3, B4, B11, B19 B22, B25, B18,B33 E1, E2, E3, D1,E4 E5, E6, E7, E8,D5 D6, D8, E9, D10 E10, E11, E12,E13 E14, E19, E20 E21, E22, E15 D20, E17, E18 E28, E27, E31 E30, E36, E25 E32, D25, E24 E35	B3, B23, B25, B32 E1, E2, E3, E4, E6 E7,D5, D8, D9, E10 E11, E12, E13, E14 E18, E19, E20, E21 E23, E24, E25, E15 E16, E17, E26, E27 E28, E3], C1, C7	B1, B2, B4, B7 B19, B24, B25 B31, B32, B33, D2 C1, C2, C3, C4 C6, C8, C9, C10 C11	B1, B2, B5, B23 B25, B31, B32 D2, E6, D5, D6 E17, D23, D24 C2, C3, C4	B3, B22, B23, B25 B26, B31, B32, B33 D2. D3, E6, E7, D6 E14, D16, D24, C6
SOCIAL STUDIES	B6, B25, B28 B27, B34, B32 D1, D2, E6, D5 E7, D6, D8, D10 D11, D15, D14 E14, D18, D20	B6, B25, B18 B27, B32, B33 E6, D5, E7, E9 D10, D12, E14 E24	B6, B11, B23, B25 B31, B33, B32, E6 E7, E9, E14, E24 C1	B2, B4, B7, B11 B23, B24, B25 B31, B32, B33 D2, C1, C2, C3 C4	B2, B4 B11, B23 B25, B31, B32 B33, E6, D6, D23 C2, C3, C4	B1, B22, B25, B26 B28, B31, B32, D2 E6, E7, D6, E14 C6
LANGUAGE ARTS	B27, B31, D1 D2, D18	B27, B31, B33	B27	B4, B27, B31 B33	B27	B27, B31
MATH	B5, B25, E10 E17, E18	B25, B33, E10 D12, E17, E18	B23, B25, E10 E17, E18	B4, B7, B11, B23 B25, B33, C7	B5. B25, B33	B25